SUPPLEMENT.

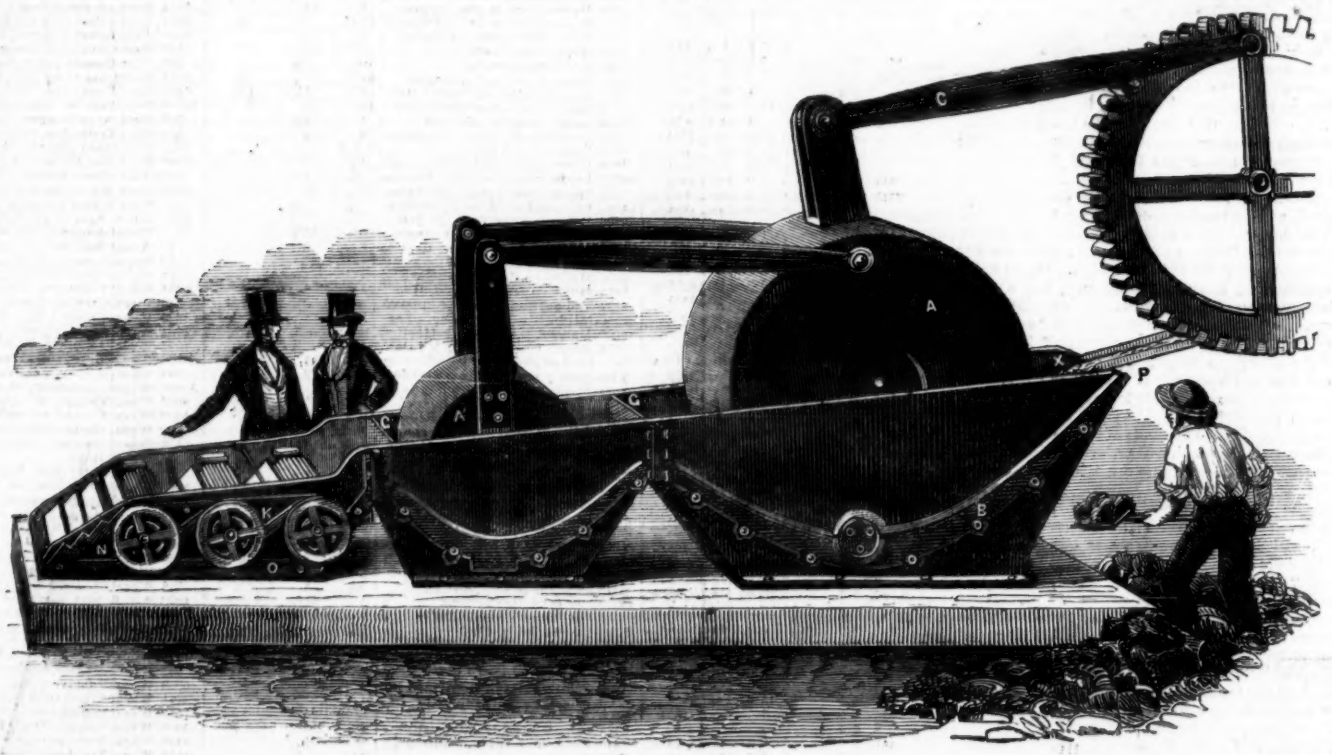
The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 972---Vol. XXIV.] LONDON, SATURDAY, APRIL 8, 1854. [GRATIS.

DR. COLLYER'S PATENT CALIFORNIA QUARTZ CRUSHER, TRITURATOR, AND GOLD EXTRACTOR.



EXPLANATION OF ENGRAVING.

ain crusher, 6 feet in diameter, weight 6½ tons, and if found ne- can be increased to 10 tons, by filling it with quartz sand—this r is so constructed, that when one portion is sufficiently worn, a urface can be presented; B, concave bed-plate, 6 inches thick; meeting rod, which may be attached to any motive power of from 12 horse; G, coarse screen; A', triturator, weight 2 tons, which can reased to 3½ tons by being filled with quartz sand, if necessary; e screen, 60 to 70 meshes to the inch, through which all the ore has before it enters the amalgamator proper; K, amalgamator; O, plug w off mercury or amalgam at pleasure; P, water pipes; N, riffles; shing chamber, into which the ore is thrown of the size of 6 lb. The machine presents 4242 square inches of crushing surface, being lent to the action of 30 stampers, each weighing 500 lbs.

Collyer, in introducing another machine for the purpose of crush- d extracting gold, seems determined that it shall stand or fall by merits. One advantage he represents his machine to possess over t introduced is the simplicity of construction, while it reduces to palpable powder at least 20 tons of ore per day, and saves all the ld without the aid of any other apparatus. It has been contended ne of the first mining authorities of the day, that the crushing and mating process can never be conducted successfully together; and machine we are now describing this objection is surmounted, as the ized ore does not enter the amalgamator until it has passed through screen, 60 or 70 meshes to the inch, and then it is thoroughly in- rated with the mercury.

Collyer is an American by birth, but was educated in this country London University, and took his degrees in the United States: he ot claim to be a mechanic, but a practical miner, metallurgist, and st, having had much experience in South America, Mexico, and Cali- ; and Mr. Frederick Saunders, the constructing engineer at the Al- ron-Works, has decided that mechanically the invention was free ny objection. It scours or rubs off the oxides, sulphurets, arse- , talcose iron, &c., which coat the particles of gold, and prevent amalgamation. It also preserves the mercury in bulk—that is, it not divide it into minute globules. This is considered important, as division is detrimental to the action of affinity which the mercury otherwise have for the gold. The machine is easily cleaned out without stopping the steam-engine; and from its extreme simplicity reat strength, it is unlikely to get out of order.

e great desideratum in all mechanical contrivances is to get rid of material when sufficiently acted upon, otherwise it interferes with execution. This is particularly applicable to the crushing of ores. convenience and novelty of the amalgamating arrangements have, e informed, been proved in practice to save at least 30 per cent. more than any other process, in consequence of their combining the che- mechanical conditions hitherto neglected. The operation may be y described as follows:—The quartz rock is thrown in at X, where am of water enters; motion to the roller is given by a connecting the stuff then passes through a coarse screen, G, into the smaller ve bed-plate, B; from thence through a screen, 60 to 70 meshes to ch; and is afterwards forced through mercury, heated by steam, othed or fluted rollers. The model is well worthy the inspection ose interested in gold mining. A large machine is being constructed ssrs. Ransomes and Sims, of Ipswich, and which will be immediately itted to public test and use.

"PALMAM QUI MERUIT FERAT."

Sir,—Having just arrived in England, and perceiving my name asso- ciated with rival inventors, I deem it an act of courtesy to inform them and the mining community, that it is not my disposition to wage war by resorting to abusive or invidious particular comparisons relative to the various machines for the reduction of ores, and saving the gold therein contained—such a course of conduct must ultimately recoil to the disad- vantage of the scurrilous assailant: it also augurs badly for the inven- tion; for the scientific and practical miner will soon discover whether the appliances are such as to meet the long-required desideratum—namely, economy of power, rapidity and efficacy of execution, durability, simpli- city, and the capability of saving the fine gold confined in the sulphurets, arsenurets, oxides, ferruginous decomposed quartz, talco-micaceous slate, &c., which has been hitherto lost.

In the United States, within the last two years, various machines for this purpose have been brought to public notice; none, however, have had but an ephemeral existence in practice at the mines—some were worn out in a few weeks; others only ground a small quantity of ore daily, which had to be previously reduced to gravel-size by the aid of stampers; while others lost their spherical form. None of these did, or ever could, act as efficient amalgamators—they all cut up the mercury, which was found in the tailings with amalgam in large quantities. The farcical idea of recovering the gold at the crushing point, which some inexperienced persons have considered essential, is the cause of this great loss of mer- cury and fine gold. The temporary notoriety which some machines ob- tained in America was occasioned by the entire absence of every requisite adapted to practical operations. This circumstance has had an evil ten- dency, in rendering capitalists extremely cautious to all untried and new inventions. For let it be remembered that a few tons operated on in small parcels is no criterion of the excellence of any machine. If 100 tons were to be acted on continuously, then an approximation of the machine's capacities might be arrived at.

My invention was made at the mines in California early in the year 1851. I had a small-sized machine built in San Francisco, merely as an experiment. I took it to Grass Valley, and put it into operation. In testing the tailings or refuse from the stamping mills I recovered about four dollars to the ton, besides much floured mercury. Though my ex- perimental machine was defectively made, I became convinced that the principle employed by me (*i. e.*, trituration, was correct, and only required to be tried on a large scale to effect the desired end.

I visited all the mining regions in California, analysed the refuse from the different mills, and in 1853 took passage for New York. I pre- sented my model and drawings to Frederic Saunders, Esq., constructive engineer of the Allaire Iron-Works, New York, who at once decided that, mechanically my invention was free from any objection; whereupon the managers of the works, Messrs. Secor and Breastead, undertook to make a large sized machine at their own expense, which was completed in Dec. last, and found to surpass my most sanguine expectations—crushing, pul- verising, and triturating at least 1 ton each hour of the toughest and hardest ores to an impalpable powder; dispensing with the use of stampers or any other crushing apparatus. So perfect is the amalgamating process, that during 24 hours' active operation not one globule of mercury was lost. These results are accomplished at an expenditure of from 8 to 10-horse power; convincing the mining community that at last the object so long sought for has been achieved. Messrs. Secor and Breastead became the purchasers of one-third of the United States patent, for the sum of $50,000, and are now executing orders for Mr. Goodell, of North Carolina; Mr. Lemuel Williams, president of the Transportation and Mining Company of North Carolina; Mr. J. B. Halsey, of California; and J. B. Tournier, of Mexico—making in all 12 machines in progress of construction. The above-named gentlemen are experienced practical miners. I have just re- ceived the British patent, and will forthwith have full-sized machines constructed and put in operation in London and at the mines, when the English mining public shall judge for themselves. All I ask until then is a suspension of judgment as to the relative merits of any other machine. I am sorry to see, in perusing your Journal, that what should be honour- able rivalry has descended to personal abuse and vulgarity. When my machine is finished, if it does not excel all others I hope to retire from the field with the consciousness that, having had to contend with honourable foes, I will not have received a dishonourable wound.

4, *Norfolk-street, Strand, April 5.* R. H. Collyer, M.D.

P.S. My model will be shown to those specially interested any day be- tween one and two, p.m.

The following are selected from numerous communications addressed to Dr. Collyer:—

New York, March 15.—In compliance with the request of a friend who desired my opinion, I have examined the construction, and witnessed the operation, of your quartz crusher and gold extractor. This instrument presents, in combination with the very unusual and desirable element of trituration, that of solidity of structure, facility of reduction of an ore, and effective and economical amalgamation of the metal. I am of opinion, therefore, all things considered, that your mineral crusher and gold extractor is the best one I am yet acquainted with.

Chas. H. Haswell,
Consulting and Superintending Engineer; late Engineer-in-Chief of the U. S. Navy Department, Brooklyn.

New York, March 17.—We have examined your quartz crusher and amalgamator, and have seen it in operation; and can with great pleasure state that it is the only thing of the kind we have yet seen that is at all calculated to grind or crush quartz rock or any other hard substance to a fine powder, and these machines of yours have done it to admiration.

J. Breastead, T. F. Secor, } Managers of the Allaire Works.

New York, March 1.—I have followed the occupation of mining in Mexico for the last 20 years. I am acquainted with all the novel inventions of the day: none, how- ever, can be compared to yours for the remarkable ease with which it reduces the toughest and hardest ores to the most impalpable flour. For durability, excellence in execution, and economy of power, your machine stands alone. The amalgamating process only requires to be seen in order to be at once appreciated by the practical miner.

J. B. Tournier, Mining Engineer.

New York, Feb. 20.—In Mexico and California I have been for many years super- intendent of the working of mines for silver and gold. I witnessed the operation of your machine at the Allaire Works, when above 10 tons of hard ore was reduced to a fine powder in eight hours. Your method of amalgamation possesses the rare qua- lity of preserving the mercury in bulk; for, after the operation, not one grain could be discovered in the tailings by the most careful washing. I am of the opinion that you have attained the long-desired object, and that the mining community cannot re- main indifferent to the merits of a machine so simple, so effective, so durable, and which cannot fail to save the fine gold which has been previously lost by all other machines.

J. B. Halsey, Mining Engineer.

TO MESSRS. RANSOMES AND SIMS, IPSWICH.

Allaire Works, New York, Feb. 28.—In bringing before your notice the quartz crushing machine, of which the accompanying sketch is a representation, I do so with much confidence, having during the last three months put it to a most severe and complete test. Dr. Collyer, the patentee, who has been practically mining in the gold regions of California, presented his model at these works some six months since, and so forcibly was I struck with its combination of the required movements, simplicity of construction, and durability, that upon my representation the managers at once consented to make one upon their own risk. The machine has accomplished more than our most sanguine expectations. You will at once perceive that it admits of one of the most direct, simple, and effectual applications of the power, which power is but little more than is required to roll the two crushing rollers up their respective inclined planes, their own weight causing them to slip back again, thereby causing a most perfect crushing and pulverising action. In the machine we have at work, the large roller is 6 ft. in diameter, the small one 3 ft., and weighing about 6 and 3 tons; and with about 10-horse power we can crush easily a ton of quarts per hour, reducing it from pieces 2 in. cube to an impalpable powder. The fact of the machine admitting such large pieces being fed in without detriment to it is a feature greatly in its fa- vour. Mr. Berdan's machine, which made quite a *furor* here for awhile, and, I hear, is doing so now in England, was the best that had been brought before the public previous to Dr. Collyer's; but several gentlemen who have had the machine in operation, and since called upon us, agree that it is a comparative failure, and have offered the machines at old iron price, after using them but a short time. Both sci- entific and practical men concur in stating that the amalgamating process, as applied in Dr. Collyer's machine, is most perfect, as it keeps the mercury in a body, whilst in Mr. Berdan's process it is cut up into innumerable particles. At Dr. Collyer's request, to name some firm most calculated to carry out his views, should they be disposed to enter into them, I have penned this to you. Where there is a market for a crusher and pulverising machine, I have no doubt Dr. Collyer's will take the pre- cedence, and prove an advantageous undertaking to all parties connected with it.

Frederick Saunders, Constructing Engineer at these Works.

NOTES ON GOLD SURVEYS IN WALES.—No. VI.

BY JOHN CALVERT, ESQ.

Clogau has naturally attracted much attention of late, and has created great excitement on account of the very rich specimens from it, which have been shown in Merionethshire and London. I was informed by the Messrs. Sherwood and by Mr. Goodman that the discovery which so lately took place of these rich gold ores was in consequence of the examination of some rejected stuff on the surface from the old copper workings, which had been abandoned many years ago. It is supposed that gold not being thought of in those days as existing in the country, the stuff was thrown away as inferior copper ore; otherwise, the appearance is so remarkable that in the present day it could not escape attention. The surface heaps had become grass grown; but on investigation some of the earliest lumps broken showed rich incrustations of metal, which were readily recognised as gold. Such proofs were obtained of its richness, that the owners caused the entire of the stuff to be secured in the offices of the mine, where I saw it, and where Mr. Goodman was kind enough to break me off a specimen.

In the Clogau office I saw the stuff lying in large blocks of some hundred weights, showing gold all over, beautifully disseminated; and the metal standing out in many cases on the surface of fracture. In several of the large blocks were the mark of the bore—the gold being welded by the action of boring. The ore I examined was highly promising in one point, that a great quantity of it was of general uniform richness—the gold standing out prominently from the quartz. The stuff having been exposed to the weather for some 18 years, the abrasion of the atmosphere had acted to expose the gold, and likewise the decomposition of the pyrites, which has coloured the surface with a rich brown tint.

It would be difficult to form an estimate of the exact value, or of the actual yield of the mass of quartz carted away from the ground; but some of it will most probably be from 2000*l.* to 3000*l.* a ton, judging by the rate of the specimens I saw. As to the value of the mine itself, few would like the responsibility of drawing up an estimate. A few fathoms of the lode would yield, if it held down, perhaps a million or two; and great confidence is expressed by the owners as to its extent. No one who sees the specimens can doubt their richness. The most unpracticed eye will observe the gold; whereas in the common form of ores the gold is seldom visible to the naked eye, nor always to the microscope, though gold is commonly easily recognised, as it is generally found in its natural metallic state. I may observe, by-the-bye, that some dispute has taken place with regard to this Clogau stuff, and other minerals containing gold, being gold ore or not. On the supposition that gold is always mechanically and never chemically combined, it is denied that the public are right in speaking of gold ores at all, as it is imagined that an ore must be a chemical combination of a metal, and that native metal does not constitute an ore. Such a distinction has been attempted to be drawn by some modern writers endeavouring to reverse the meaning of the word; but I am not aware that there is sufficient authority for the innovation. Ore is not a word derived from the contintental scientific vocabulary, but a word purely English, of Anglo-Saxon authority, and having correlatives in most of the Germanic languages. Being a little fearful lest I may have sinned in following the general meaning of the word "ore," instead of that suggested by some of the writers on mineralogy, I have looked into the dictionaries, and I find that the word "ore," "oar," or "ora," has been used by writers and speakers from the Anglo-Saxon times downwards to express any minerals containing metal. There is some reason to believe that the word was first applied to minerals of copper—that sense being retained in some of the languages, green copper, or "aurichalcum," is quoted by Bosworth as being called "arene ora" in Anglo-Saxon. Ore is called "erz" in German, and "oor" in Dutch. The term was commonly used in the middle ages, and especially applied to minerals containing gold. The popular meaning is justified by numerous authorities in Johnson, Bosworth, and Richardson. Webster has quoted the narrower meaning from Olensted; I believe, therefore, that it is still perfectly justifiable to speak of "metal," or "a vein of metal," as an ore, without regard to any fanciful distinctions.

Clogau is in South Merionethshire, about three miles north-west of Dolgelly, and five miles north-east of Barmouth as the crow flies. It is one of a series of spurs or small mountain chains running towards the Barmouth or Mawddach estuary, into which fall two brooks—one rising on each flank. Clogau will be found on the Ordnance Geological or plain sheet, No. 75 south end, and the neighbouring country on No. 59. The south of the chain near the estuary is worked for copper; but this is not included in what I am now speaking of as the Clogau sett, which occupies the northern part of the chain. Clogau range is parallel to the Vigra spurs and Prince of Wales, and it belongs, therefore, to the latter neighbourhood, but connected with the Dolfrwynog and Cwmheisian gold districts. The old level that was put into Clogau was driven about 20 yards. The Clogau sett consists of a series of parallel lodes. The gold lode runs east-north-east, dipping north. It may be traced for some distance, taking its start from the Vigra Mines, coming into the sett through Ton-y-cornel on the western side, and seeming to run regularly for the mountains having the Ordnance flagstaff, or Craig-y-Cay; and thence, with parallel lodes, more or less prominently showing themselves, and traceable through the country, it seems to proceed to North Dolfrwynog and Cwmheisian. In the immediate vicinity of the gold lode I found an accompaniment which seems to be prevalent in Wales—namely, a laminated gritstone, but which is in many places so altered and metamorphised as to suggest the immediate neighbourhood of igneous action, most probably represented in the form of compact greenstone. Again, I observed chlorite schist, more or less evident here and there, lying beneath the grit. This chlorite seems a never-failing accompaniment of gold quartz with these lodes. In many places where the grit was lying horizontally in the vicinity of a vein, I found it thickly disseminated with large cubes of sulphuret of iron. These cubes all decompose on the rock being exposed to the action of the atmosphere. On going on to the top above the level, the lode is very strong, and appears squeezed in some places, and very upright at the surface, although with every indication of dipping very much to the north as you get down. The vein is highly ferruginous; and just at the point above where the gold was obtained from the lode seems distorted, and has evidently a twist, most probably from the immediate vicinity of trappean or other igneous disturbance. The laminated gritstone, or sandstone, is very much distorted; and here and there the clay-slate becomes uncovered, and is of a highly-promising character for metalliferous products. Greenstone shows itself in the immediate neighbourhood of Clogau and the other setts. The Flagstaff Hill, or Craig-y-Cay, I have likewise examined. It lies east-north-east from Clogau, and is a high, prominent, barren-looking ridge. At the top of the mountain I found the laminated gritstone lying horizontal; whereas on the flanks it was lying at a little more incline than the angle of the mountain. In some places the gritstone was so much metamorphised, that out of the same locality such different specimens of rocks would be obtained that they would be regarded in succession sedimentary and igneous. In the places where it is mostly altered, it is to be found approaching to a columnar character. I have often noticed, both in America and Australia—in the latter more especially—this columnar characteristic which these sandstones assume, frequently deceiving the casual inspector, and causing him to note it down as of basaltic or trappean formation, whereas it is merely sedimentary rock, highly altered in its external or crystalline character by being in the vicinity of true igneous rocks.

Here are many quartz veins and occasional beds found crossing with the grit, and some lying at the same angle with it. At one point it seems in meeting a strong quartz vein to widen it excessively a little south of the point of junction, and to twist it rather out of its course. Here is a show of various metallic arrangements; and upon examination this proves to be one of the places in which gold exists.

The chlorite schist, which I have already remarked as an indication worthy of notice, is associated with the quartz in the neighbourhood, and becomes promising for metal. The surface is likewise strongly coloured with oxide of iron; the vein here, as at Clogau, is found dipping north. While engaged in the northern part of the country at Bron-Eryri, which I have before described, I was induced to examine the surface soil. Mr. David Williams's men performed the operation of washing rather rudely, but they succeeded in obtaining gold. The red earth is here exactly of the same character of soil as is washed in the dry diggings of Australia; and this indication, with the discoveries of gold already made on the property, induced me to examine it. The formation is, however, very patchy, and locally distributed, and the stuff similar to some I washed in Cumberland. It is interesting as highly indicative of the character of the quartz in the immediate vicinity.

Most of the auriferous lodes I have found or seen in this part of the country generally run east-north-east, and in some instances east and west, and commonly they dip to the north. There were many parallel quartz veins crossing the country, and millions of tons of quartz lie exposed and jutting out on the mountain sides, open to the test of the explorer.

In reference to the arrangements I have now in progress for the reduction of gold and other ores, I may state that they include among others the following modes for operating on the mineral. One mode is by the application of battery power on a large scale, effecting electro-chemical decomposition. I likewise take advantage in some processes of chemical action; in others of positive heat. In the amalgamating machine which I propose to adopt, I shall secure a continuous supply of fresh mercury. This I look upon as highly useful, and though propositions have been made for using a mass of mercury, to be locked up for a month, I am not inclined to accede to the utility of such an application. The old practice of open-air decomposition I consider to be exceedingly useful for the treatment of several ores, and particularly some gold ones. Economical stamping is of the highest value with ores of poor average. Besides machinery of my own invention, I intend to avail myself of many valuable inventions which are placed at my disposal. A further specification of the modes of procedure is prevented by the necessity of obtaining patents in several countries.

MELTING POINT AND TRANSFORMATIONS OF SULPHUR.

Mr. B. C. Brodie, F.R.S., read a paper on Sulphur, at the Royal Society—in the course of which he remarked that in the various treatises of chemistry, great discrepancies exist respecting the melting point of sulphur, so much so that he was led to make several experiments, with the view of discovering, if possible, the true laws which regulate the transformations of sulphur and its liquidation. The melting point of sulphur varies according to its allotropic condition. This condition is readily altered by heat, and invariably, without peculiar precautions, by melting. Hence the temperature at which sulphur melts is different from that at which it will solidify, or at which, having been melted, it will melt again. The melting point of the octohedral sulphur is 114·5 deg. But from the facility with which this sulphur, when heated even below its melting point, passes into the sulphur of the oblique system, this fact may readily be overlooked. When this sulphur, even in the shape of fine powder, is heated for the shortest time, between 100 deg. and 114·5 deg., this change cannot be avoided. For the transformation of large crystals a longer time is required. At a certain point the crystals become opaque, and are often broken in pieces at the moment of the change. When sulphur has been converted by heating a sufficient length of time, it acquires a fixed melting point of 120 deg. This is the melting point of the oblique prismatic sulphur. If sulphur thus converted be carefully melted, so as to raise the temperature as little as possible above the melting point, no sensible difference will be observed between the point of melting and that of solidification. To obtain this fixed melting point of 120 deg., care must be taken that the transformation or the sulphur has been thoroughly effected. If this be not done, it may melt at any point between 114·5 deg. and 120 deg. If, however, the temperature of the melted sulphur be raised above its melting point of 120 deg., the point of solidification will be altered, and will lie even below the first melting point of 114·5 deg. The sulphur which is insoluble is bi-sulphide of carbon. This is prepared by extracting the hardened viscid sulphur with that re-agent, which has a melting point considerably above 120 deg., but which the author has not been able to determine with precision. It is stated in chemical treatises that the opacity, which on solidification comes over the melted sulphur, is due to the transformation of the oblique prismatic into the octohedral sulphur, and the consequent disruption of the crystal. To this cause is also attributed the evolution of heat, which has been observed in solid sulphur immediately after cooling. There are, however, no sufficient grounds for this view, and some of the observations are decidedly adverse to it. On extracting melted sulphur which had become opaque with the bi-sulphide of carbon, traces of insoluble matter were constantly found, even when the greatest precaution had been taken to avoid elevation of temperature, and this opacity appears to be due to the hardening of the viscid sulphur, and the consequent deposition of opaque matter in the pores of the crystals, which is quite sufficient to account for it. It remains, therefore, to ascertain the cause of the evolution of the heat; and on this point the author suggests that when the sulphur is tempered the change takes place very slowly, and the heat evolved is not perceived. This view is confirmed by a fact that the viscid sulphur possesses another solid form. The author has found, moreover, that when sulphur melted at a high temperature is suddenly exposed to intense cold, such as the cold of solid carbonic acid and ether, the sulphur formed is not viscid, but solid, hard, and perfectly transparent. When the temperature is allowed to rise to that of the air, the sulphur becomes soft and elastic. It is probable that this is the true solid form of the viscid sulphur.

CAPT. NORTON'S RAILWAY SIGNALS.—Sir Colman O'Loughlin, Q.C., accompanied by a numerous staff of gentlemen of the "long robe," have witnessed Capt. Norton's practice with his railway signals in the Victoria Park, near to the Cork and Passage Terminus. Three different signals were successfully fired—the first was attached to the broad head of an ashen-arrow; a string being tied at one end in the eye of the twisted frictional-wire, and the other end fastened round Capt. Norton's waist; the arrow was then shot nearly perpendicularly from a lancewood bow of about 50 lbs. strength, made by himself. When the pull of the wire at the end of the line fired the signal, which was charged with an ounce of Hall's rifle-powder, the length of the string was 60 ft. This signal of mimic thunder and lightning is to be used by the guard of a train that has met with an accident, which brings it to a stand still, as was the case in the Straffan catastrophe. The brilliant flash and loud report of this thunder is to warn the coming train not to run into the one that is disabled and in "a fix." The next three signals were fixed on the head of the arrow, and shot at an elevation of about 45°—they all severally exploded on falling on the soft grass alluvial soil, at about 100 yards distance. These signals are to be used by the guard of a train, when he wishes to communicate with the driver of the engine from the extreme rear of the train; they can be shot in a direct line over the entire train, of whatever length it may be, and can be made to fall on the road from 50 to 100 yards in front of the driver of the engine; the vivid flash and sharp report of the exploded signal is sure to be seen and heard by him. The impulse of the running train preserves the relative impulse from the bow. The third signal fired was similar in construction to the first—Capt. Norton tied it to a post, then pulled the attached cord and fired it. For signalising at sea, it may be attached to a cord having a small swivel at one end, and being instantly drawn up to the mast-head, when a sudden pull, like that of a bell-string, explodes it with a vivid flash and continued white or other coloured light. This signal may be used in cases where snow covers the rails, it being secured to a post on one or both sides of the road, the coming engine presses against the connecting-line, and fires one or both such signals. In like manner it can be used at sea; in case of fogs, it may be attached to buoys, the coming vessel presses against the connecting-line, and fires one or both signals, or submarine explosive shells. This manner of firing explosive-charges, either above or below water, is more ready, available, and efficient than a voltiac battery. Sir C. O'Loughlin, and the gentlemen with him, expressed themselves highly pleased with the simplicity and efficiency of these railway signals. Capt. Norton's next practice, on the same ground, will be with the signals having heads, such as a lady's thimble, charged with Vallanciennes's composition, or as some call it Greek fire, which will burn with a bright light, that cannot be extinguished in or on the ground for more than a minute after the explosion of the signal. A few hundred of these inextinguishable flogistic pellets, encased in their calico "night caps," put into a 10 in. concussion-shell, would make a very *efficient asphixia*-shell, for destroying anything intended to beset on fire.

ROASTING IRON ORES ASSISTED BY A JET OF STEAM.—In 1843, Von Nordenskjöld recommended some trials to be made in roasting magnetic iron ore containing pyrites, with the assistance of a jet of steam, at the iron works of Dals Bruck, in Russian Finland. The roasting was effected in a kind of reverberatory furnace, prepared by Count Romford, and was effective, the whole of the sulphurets having been completely decomposed. The pig-iron subsequently produced from that ore yielded an excellent bar-iron, without the slightest trace of red-sear. Since then the process has been much used both in Finland and in the Ural, as well with charcoal as with waste gas from the tunnel head. In 1845, Nordenskjöld improved the construction of the roasting furnaces, by given them almost the exact form of the Norwegian and Swedish gas furnaces. In order that the action of the steam be fully effective in roasting the ore, there must be a corresponding access of air. Steam and sulphuret of iron mutually decompose one another, with the production of oxide of iron and sulphurated hydrogen. If the latter, as fast as formed, meets with a sufficient quantity of air, it will burn, producing sulphurous acid, which in its passage through the ore produces no injurious action. If, however, there be not sufficient access of air, a portion of the sulphurated hydrogen in passing over an oxidised ore, beyond the direct action of the current of steam, would be decomposed, producing water and sulphuret of iron again. This process of Nordenskjöld is of great importance, independent of the improvement which may be effected in the quality of the iron, by the almost complete removal of the sulphur, inasmuch as it renders the process of roasting the ores, by means of the waste gases from the tunnel head, perfect, and effects so great a saving in the amount of fuel consumed in this part of the process of iron smelting as to lower the cost of production very considerably.—*Scheerer's Metallurgie.*

SAFETY LAMP.—M. Chuard has been endeavouring to improve the construction of the safety lamp, so as to render it, as far as possible, safe; and although he has not as yet succeeded in reducing his plan to practice, he has been so far successful as to induce a commission of the French Institute to award him a prize of 500 francs, as an encouragment to proceed with his praiseworthy efforts. He proposes that the air should only arrive at the flame after having passed through a considerable length of metallic tube, the orifice of which is capable of being closed by a piston, kept suspended by a thread in a particular way. If the quantity of fire-damp should so increase as to produce an explosive mixture, a portion will burn in the interior of the lamp and consume the thread, by which the piston will fall and close the air tube before the flame can pass through the gauze.—*Comptes Rendus de l' Academie.*

IRON MANUFACTURE AND MACHINERY IN AMERICA.

Among the numerous miscellaneous facts which Mr. Whitworth has brought together in a paper which he has published, containing the results of observations made during his tour among the manufacturing districts of America, which he undertook in consequence of being prevented from making a report upon the machinery in the New York Exhibition, are some of considerable interest, showing the progress made in that country. In pickling light iron castings in England, it has been usual to immerse them in dilute acid, for a sufficient time to perfect the process. In the United States, probably from the great demand for labour, a plan has been adopted, by which the pickling is more rapidly effected. The castings are placed on wooden stages, covered with lead—20 ft. long by 12 ft. wide, supported on rollers, 18 in. from the floor, by which they can be made to incline at any angle, and in both directions. The trough containing the pickle—one part acid to two and a half parts water—is of the same length as the stages, and is placed at the lower end to catch the drainings. The dilute acid is poured over the castings by hand from a long-handled ladle, and when dry the operation is repeated as often as necessary. The stages are cleansed from the coating of acid and sand which remains on them, by a powerful stream of water from a hose pipe.

A peculiar method of annealing the leading and trailing wheels of a locomotive engine has been adopted in a large manufactory in Philadelphia. The wheels, which are generally cast-iron hollow disc wheels, are taken from the moulds before they contract from cooling, and as soon as they can bear moving without altering their form; they are then placed in a circular furnace, previously heated to a temperature about equal to that of the wheels when taken from the moulds. The opening is then closed, and the temperature raised to a point a little below that of fusion. All the avenues to the interior of the furnace are then closed, and the whole is left to cool gradually, the heat penetrating through the exterior wall, composed of fire-brick, 4½ in. thick, surrounded by a sheet-iron casing, ½ in. thick. By this process the wheel is raised throughout to one temperature before it begins to cool, and as the heat can only pass off through the wall every part cools and contracts equally and simultaneously with others. The time required to cool a furnace full of wheels is about four days; and by the process they may be made of almost any form and proportion, and with a solid nave. The manufacture by this process was commenced in 1847, and in 1850 the quantity finished per day was 15 tons. The foundry and works, as soon as completed, are capable of turning out 40 tons per day. In another establishment the mass of metal near the centre only is cooled, which, in some measure, prevents unequal contraction. To effect this the wheel is lifted hot from the mould, and the centre placed in a hole communicating by a flue with a chimney, and the edge packed round with sand; a draft is thus obtained, which effects the object. In some cases the wheels, when cast, are placed in a pit of white sand, and left to cool gradually. Cold blast iron, made with charcoal, is employed.

There is in the United States a large demand for railroad spikes; on nearly all the lines the plan adopted being to lay the rails on transverse wooden sleepers, and simply to fasten them down by iron spikes with projecting heads, except at the junction of two ends of rails, where the ordinary chair is used. In a manufactory of Pittsburg a machine was at work capable of making 50 per minute, of ½ lb. each. They are packed in kegs, each containing 300; and, with only seven men employed, the works are capable of manufacturing 5 tons of spikes per day.

In another establishment at Pittsburgh 250 men are employed in manufacturing bar-iron, rods, sheets, and nails. There are 51 machines for cutting nails, many of them self-feeding for the smaller sizes. As many as 2000 kegs are made per week, each weighing 100 lbs. One machine for making rivets turns out 80 per minute, of 7 to the pound. The manufacture of cast-steel is not carried on to any great extent. Some works were established at Pittsburgh, in which at first great difficulties were met with, but they have latterly been more successful. They have two converting and nine melting furnaces, producing 2000 lbs. of steel per day, which realises 8½d. per lb. The engine-tools employed are of old forms of construction, and inferior to those in use in England. Slide and hand lathes are common, as also planing and drilling machines, but very few shaping machines, horizontal or vertical, and much hand-labour is therefore, expended on work which could be much better performed, and more economically, by machinery. The foundries generally are large and well arranged, and furnished with powerful cranes.

ELECTRIC INSULATORS.—Dr. Turnbull, at the February meeting of the Franklin Institute, at Philadelphia, described two new kinds of insulators for telegraph posts; one being a modification of the form designed by Mr. J. M. Batchelder, of Boston, but omitting the employment of iron. It is composed of quartz and felspar, thoroughly vitrified on the surface, is very compact, equal to the best forms of glass insulators, but much stronger. The form is that of a cup, with a ridge for the purpose of fastening the wire, with an inverted edge to direct the rain downwards, and prevent moisture entering the inside of the cap. Mr. Batchelder is endeavouring to modify and improve this insulator still further, as it would, by the moisture settling upon it, conduct the electricity to the ground. He proposes to give it a kind of downy covering, to cause the moisture to remain in an isolated state upon it. The other insulating substance is composed of the best Insulator known, caoutchouc; a change is produced in this substance by heat, rendering it impervious to moisture, heat, and rapid decomposition. It is of a dark colour, and has a ringing noise when struck. It does not soften in water at 212°; strong sulphuric acid has no effect on it, and even pure nitric acid does not alter its elasticity, but merely changes its colour to a yellow. This acid alters common caoutchouc into a mass of a brown colour, which on pressure falls into a powder. It burns freely, giving off scintillations as if combined with metallic oxides, and leaving a polished surface; while ordinary caoutchouc, when burned, gives a pyro-oil which stains the fingers. The new substance has all the qualifications of a good insulator.

IMPROVEMENTS IN FURNACES.—Mr. Horton has obtained letters patent for a novel arrangement of furnaces for steam-boilers, combining great economy with an entire prevention of smoke. In addition to the furnace formed in the usual manner, with stationary fire-bars, an extra grate is placed at right angles with it on each side, forming in all three separate fires, communicating at one bridge, which is common to all. The flue runs direct through the boiler, similarly to the Cornish plan, but a number of tubes communicating with the water cross it, and add materially to its capability of receiving heat from the furnace, and getting up steam with great rapidity. The inventor has hit upon a novel mode of supplying the air required at the different stages of combustion of the fuel. A tube is introduced, one end of which is placed immediately above the furnace-door, closed with a valve, by which the quantity of air may be regulated as required, and terminating directly before the bridge, where the flames of the furnaces unite, and by the supply thus afforded, the emission of dense smoke is prevented. By these arrangements, the course of the flame and heated air surrounds the lower half of the boiler and its cross-tubes, and keeps up a well regulated temperature; and the patentee states in his prospectus, that, in addition to the prevention of smoke, a saving of 35 per cent. is effected in the consumption of fuel; while he confidently anticipates that the furnace and bottom plates are less liable to injurious action from the fire. By feeding the three furnaces alternately, the dense smoke from one passes over the incandescent fuel on the other, the carbonaceous particles are consumed, and only an invisible vapour escapes from the chimney top. A very slight attention on the part of the stoker, in regularly charging the grates alternately, will secure the above described advantages.

CONSUMPTION OF FUEL IN STEAM-ENGINES WITH SINGLE AND DOUBLE CYLINDERS.—M. Farcot, machinist, at Port St. Ouen, has made experiments upon two machines made by him for the plate-glass manufactory of St. Gobin, which may serve as a basis for a rigorous comparison between machines of one and two cylinders. The experiments were made under the direction of Mr. Laforet, engineer of the glass works at Chauny. The first machine, with two cylinders, has a nominal power of 30-horse, and makes 28 revolutions per minute. When tried on the 26th Oct., during five hours, at 35-horse power, under a pressure from 4·75 to 5 atmospheres, it consumed less than 1·15 kil. (2½ lbs.) of common charcoal per horse power per hour. Afterwards tried at 45-horse power, it worked with the greatest ease. The second machine is horizontal, has but one cylinder, working at 42 revolutions per minute, and is also nominally 30-horse power. Tried for five hours, on the 28th Oct., it consumed only 1·106 kil. (2·4 lbs.) per horse power per hour. Afterwards tried at 49-horse power, it gave no evidence of injury to any of its running parts. These two machines have now been in regular service for several months, and work usually with a force of from 40 to 45-horse power. It has been hitherto admitted that the double-cylinder machines expended less steam and fuel than those with one cylinder. The preceding experiments show that, when well constructed, the expenditure is the same in both of the systems. If it be true, theoretically, that the double-cylinder machines work more regularly, it is now certain that, practically, the one-cylinder machines of M. Farcot work with a perfect regularity. Horizontal (oscillating?) engines, for instance, drive spinning machinery and paper works more regularly than the hydraulic motors which they replace, and actually leave nothing to be desired. The latter adjustment to that of the shafts which they drive. Our readers will observe the price, for equal force, is less than that of fixed machines, and their velocity is better low rate of consumption in these two machines; it is much less than that required for the best engines turning an axis hitherto known. The arts have, therefore, realised in this respect an immense progress of 2 or even 3 kilogrammes (4½ to 6½ lbs.) per horse power per hour. This advance is especially due to the Society for the Encouragement of National Industry, for they have always excited, proved, sanctioned, and recompensed it.—*Cosmos.*

AMERICAN COAL FIELDS.—Let us for a moment take a glance at the immense extent of the formation that covers large portions of Pennsylvania, Virginia, Maryland, Eastern Ohio, the eastern part of Kentuckey, a part of Middle Tennessee, an undefined portion of Alabama, the vast coal country in Illinois, Iowa, Missouri, Arkansas, and a considerable portion of Michigan, and we find that our resources are abundant. The valley of the Mississippi, according to Mr. Stuart's interesting "Travels in the United States" (2d volume), contains the largest coal fields, or rather, collection of coal fields, in the known world. This coal field alone would cover half of Europe, having an extent of 900,000 square miles, or 1500 miles in length, by 600 miles in breadth.—United States *Mining Journal.*

UNITED GUARANTEE AND LIFE ASSURANCE COMPANY.

The fifth annual meeting of shareholders was held, at the company's offices, Old Jewry, on Thursday.—Mr. G. A. Hamilton, M.P., in the chair.

The advertisement convening the meeting having been read, the directors' report was submitted, together with a statement of the receipts and expenditure for the past year, ending Dec. 31. The directors state in their report that the excitement produced in the public mind, in the early part of last year, on the subject of life assurance, in consequence of the parliamentary enquiry proposed by Government, and more particularly pending the discussion of the question, tended in some measure to retard the operations of offices of recent date, and thereby rendered it difficult to sustain the ordinary accession of income from new business; but it is satisfactory to know that the amount of premiums received by this company on new policies, nevertheless, closely approximated to that of the year 1852.

Since the establishment of the company in April, 1849, to the 31st of December last, 4383 proposals have been made for assurances, of which 2223 have been decined, or not completed, and 2660 accepted. The premiums received during the past year amounted to 9325*l.* 10s. 1d. During the three months ending March 31, a satisfactory increase on this amount has manifested itself, and the income of the current year cannot be reasonably calculated at less than 12,000*l.* The "Fidelity Guarantee Department" has established the gratifying fact that this portion of the company's business has proved remunerative, while its rapid extension shows that its utility is felt and its benefits appreciated more and more by the community. Among the valuable new connections acquired by the company in the past year may be mentioned the Midland Railway, the Grand Trunk Railway of Canada, and other important railway companies, while our banking interest has been fortified by the accession of the National Provincial Bank of England, Messrs. Hankey, Prescott, Williams, &c. Business of considerable amount has also been effected with the colonies.

The report of the Select Committee of the House of Commons on "Assurance Associations" has been laid before the public, and the enquiry will, doubtless, prove of benefit to this description of enterprise, inasmuch as the committee state in strong terms that the application of the principle of life assurance is capable of great extension, not only in the higher and middle classes of society, but also among the humbler classes. To this branch of the company's business it is the intention of the directors to apply themselves with increased energy. The directors regret that their application to the Legislature for a "special Act" to enable the Lords of the Treasury to authorise the departments of the civil service to accept the guarantee of the company for officers under the Crown, was arrested in its progress by the chairman of the committees of the House of Lords. The bill, however, passed the House of Commons without opposition, having been previously submitted to the Secretary of the Treasury, and petitions, numerously signed by clerks and officials in the Customs and Post-office, with the sanction of the Board of Customs and of the Postmaster-General, were presented to both Houses in its favour. Upwards of 70 petitions, signed by chairmen of boards of guardians in the most important towns in the kingdom, were also presented, the question regarding security for poor-law officials rendering the powers sought for of great moment to that numerous and meritorious class of *employés*. The want of such an institution may thus be considered to have been established beyond all question; and it may be fairly expected that the technical difficulties to the recognition of this company by the Government authorities will be shortly removed.

Since the last annual meeting some important agencies have been established, and greater efficiency has been imparted to those already existing. The income of the company has now nearly reached the point at which it may be considered that a revenue has been acquired, sufficient not only to cover a liberal current expenditure, but to accumulate a fund for future claims, and to leave a surplus for division among the shareholders and policyholders of the company. Impressed with the conviction that this desired result will be accelerated and augmented in an eminent degree by the acquisition of the business of another company, by means of a union, involving little or no increase of annual expenditure, negociations have been entered into with a Life Assurance Company of large connections, and the directors hope very speedily to summon a special meeting, at which the terms of the proposed amalgamation will be laid before the shareholders.

The Chairman said, that as this was the first opportunity he had had of meeting the shareholders as their chairman, it would not, perhaps, be considered out of place if he stated the circumstances under which he had been placed in his present position. In the year 1852, when he held a high official appointment under the late Government, he was informed that three gentlemen connected with this company—viz., Mr. Knight, the secretary, Mr. Beachcroft, the solicitor, and Mr. Ryley, the actuary—were desirous of having an interview with him, for the purpose of authorising the departments of the Civil Service to accept the guarantee of the company for officers under the Crown. At that time he knew nothing of the gentlemen who requested that interview; but he was informed that they were gentlemen of high character, and he, therefore, felt it to be his duty to meet them. It so happened, however, that technical difficulties presented themselves, and the officers of the Crown were consulted. He accordingly recommended that an application should be made to Parliament for the removal of these difficulties; and he should have been most happy to have afforded every assistance in his power to forward the views of the directors; and he believed that Parliament was quite willing to assist in the passing of the bill. In fact, the bill did pass the House of Commons; but the chairman of the House of Lords, who was omnipotent in these matters, opposed it. Everything was done that could be suggested with a view of obtaining the passing of the Act; but as he had said, the chairman of the committees of the House of Lords withheld his concurrence. With regard to the retirement of the late noble chairman (Lord Erskine), although he (the chairman) had not the honour of his lordship's acquaintance, he was satisfied the shareholders looked upon his retirement with regret, and more especially as his Lordship retired in consequence of ill-health. In consequence of that retirement, he (the chairman) was solicited to supply the vacancy. Before, however, he consented to accept the responsible office of chairman, he sent queries to the secretary, which he requested him to answer, and the replies to those interrogatories were so full and satisfactory that he did not hesitate to accept the honour which had been conferred upon him. Although he did not hesitate to say that the preliminary expenses of the company appeared to him at first sight to be rather considerable, yet he found, on looking more minutely into the nature of the expenditure, that there were circumstances which satisfied him that those expenses could not have been avoided. The system which this company had adopted was an entirely new system of assurance, and therefore it was necessary to incur a large outlay at the commencement. But it was impossible to carry on any extensive business in these days without a large expenditure; and so satisfied was he (the chairman) with the position of the company, that he was clearly of opinion there was a reasonable expectation that in the course of time the shareholders would be amply remunerated for the expenses they had already incurred, and he accordingly signified his intention of becoming the chairman of the company. He had taken a very lively interest in the proceedings before the Committee of the House of Commons; and although that committee was supposed to be formed with some feeling of hostility to what were called new companies, he must do the chairman (Mr. Wilson) the justice to say that he conducted the enquiry in the most impartial manner, and evinced every desire to arrive at sound and just conclusions. Gentlemen of great experience and talent were examined, and he had much satisfaction in stating that the evidence of this company's own actuary (Mr. Ryley) appeared to him (the chairman) very valuable; and he perfectly agreed with Mr. Ryley in the tenour of his evidence, that the interference of Government in these matters was much to be deprecated, and that it had a strong tendency to impede and fetter the exertions of the shareholders. He (the chairman) believed that a bill will be introduced for the improvement of insurance companies, and he should watch such bill with much anxiety, and be happy to communicate to his own colleagues, as he would to his own constituents, whatever was calculated in any manner to affect their interests. With respect to the present condition of this company, he had already made some allusion. The report, also, gave the shareholders very full and valuable information. Experience in this life, in every sphere and position, showed the necessity of caution in all matters connected with commercial enterprise; and he believed that through the zeal and energy of the officers connected with this undertaking, the position of the shareholders was now placed on a sound basis. But very great exertion was still necessary; no branch of business could possibly be successful without exertion, and it would be most essential, in his opinion, in order to extend their business, to extend their local agencies. The report adverted to an application which had been made to Government, and which was now under the consideration of certain departments of the Legislature. The directors had not as yet been able to learn what the views of Government are likely to be; but he thought it not improbable that the terms of their application would be sanctioned. There was certainly a very great desire on the part of *employés* under the Crown to avail themselves of the advantages offered by this company; and every facility and encouragement ought to be extended to that class of the community. In conclusion, he would observe that he always considered that in all public companies unanimity of feeling ought to exist between the shareholders and the directors. The shareholders ought to be considered as partners acting for the interest of each other, and the directors as the trustees of the shareholders. The utmost cordiality ought, therefore, to exist between the one and the other. This feeling he hoped he should entertain as long as he was their chairman; and to every shareholder who required information, he should at all times be most happy to render the utmost assistance in his power. He would now move that the report and accounts be received and adopted.

Mr. Cassrox seconded the resolution. He looked upon this company as tending to elevate the rising generation. It held out to young men great advantages; and he must say that the observations of the chairman had considerably strengthened in (Mr. Causton's) opinion. So long as they were under the fostering care of their chairman, and acted under his advice, this company would continue to grow into importance, and must in the end become highly remunerative. He could clearly see that it must be eventually a very thriving concern. It was only for the shareholders to hang together, to insure a speedy and lasting success.

The following statement shows an improvement on the first quarter's business this year that of last year:—

	1853.		1854.	
January	£855 12 5		£ 947 13 2	
February	973 13 0		1023 0 9	
March	983 10 10	£2812 16 3	1514 8 9	£3485 2 8

The election of the chairman having been unanimously confirmed, and the retiring directors and auditors re-elected, a cordial vote of thanks was passed to the chairman and directors, and a similar compliment to the officers and agents. The business of the meeting then terminated.

In a paper recently read by Mr. Gibson, before the American Geographical Society, at New York, on the islands of the Indian Archipelago, strong assertions were made by the writer as to the extent of gold existing in the island of Celebes, which in his view it is destined in this respect to outvie California and Australia. "The precious metal," it was stated, "has been lately found in large flakes within the Sultanate Menado. These flakes, or sheets of pure ore, some presenting a surface of 9 or 10 in. square, though not more than an ¼ of an in. thick, have been picked out from the interstices of the masses of crystal and quartz that compose the hills of the country." It must be remembered, however, that statements equally broad and vague have often been put forth with regard to the adjacent island of Borneo, but that little has yet transpired to establish their correctness. At all events, whatever may be the treasures of Celebes, they are not likely, either from the exertions of the natives or the influence of the Dutch system in those regions, to find any early development.

Blasting.—Mr. Braunsdorf recently drew the attention of the Mining Association of Freiberg to the advantage of placing the fuse in contact with the powder in the bottom of the bore, and not with the upper portion merely, as is usually done. He showed that, where strong powder and heavy charges are employed, the upper or weakest part of the bore receives the first shock, and frequently gives way suddenly that the greater part of the charge is scattered about and produces no effect; but where the whole charge is fired from the bottom or strongest part of the bore, the greatest possible effect is produced, and the explosion is always regular, no matter what the strength of the charge may be.—*Berg und hütten-m Zeitung.*

DEPOSIT AND GENERAL LIFE ASSURANCE COMPANY.

The second annual meeting of shareholders was held at the company's chief office, New Bridge-street, Blackfriars, on Monday,

The Right Hon. Lord Viscount Drumlanrig, M.P., in the chair.

The Secretary having read the notice convening the meeting, submitted the following report:—

Your directors have much pleasure in again meeting the proprietors, and in presenting for their information, and that of the policy-holders, the highly gratifying report of the business transacted during the past year.

The directors in their last report anticipated, from the large amount of business that had been transacted during the short period of six months, greater success than had attended most societies of a similar kind, and they consider that their expectations are fully borne out by the following comparative statement of the business of the company up to the present date:—

Proposals received.		Assuring
From 20th Sept., 1852, to 25th March, 1853, a period of 6 months	342	£151,867
From 25th March, 1853, to 25th March, 1854, a period of 12 months	2127	301,013
Total number of proposals received in 18 months	2469	£452,880

Policies.	Number.	Assuring.	Producing an annual income of
From 20th Sept., 1852, to 25th March, 1853, six months, there were issued, averaging more than 383*l.* each	203	£77,861	£3,828 16 5
From 25th March, 1853, to 25th March, 1854, 12 months, averaging 246*l.*	718	177,460	6,194 13 5
Total number of policies issued in 18 months, averaging 276*l.* each	921 ...	£255,321 ...	£10,023 9 10
To which add Industrial Policies (under 50*l.*).	1019	20,412	519 0 0
Making the annual income of the company			£10,542 9 10

It will thus be seen that there has been a very marked progress in the business of this company, and your directors confidently appeal to the early history of other insurance companies to show that there have been few instances of so favourable a result.

Next to the amount of business done, the nature of the business itself is of chief importance, and it is, therefore matter, of congratulation that there have been only three deaths during the past year, assured for the sum of 621*l.* 16s., which is very much below the anticipated average of mortality, and must clearly prove to the proprietors that great care and attention have been bestowed by the medical officers in the examination of lives.

Your directors would now advert to two important sources for increasing the company's business:—The Loan Department, and the Agency Department.

In reference to the former, the directors have much pleasure in stating, that not a single loss has been sustained therein from the commencement of the company, and that its results have been highly satisfactory, and amply repay the labour and care bestowed upon it. The directors, however, in calling the attention of the proprietors to this most important and profitable branch of the company's operations, have to state, that in the first establishment of the company no such business was contemplated, and that the paid-up capital of 10,000*l.*, which was only intended for a life guarantee fund in the earlier stage of the society's existence, and would have been ample for that purpose, has been found inadequate for the full development of this branch of the company's business; and as they consider it highly desirable to continue and extend so profitable a part of the business, they recommend the shareholders to create an additional capital of 100,000*l.* by the issue of new shares, under the provisions of the company's Deed of Settlement.

As regards the agency department, your directors have given their attention during the past year to the formation and consolidation of good agencies in some of the most important towns, and have every reason to be satisfied with their present efficiency.

At Manchester, Oldham, Bristol, Leeds, Birmingham, and Northampton, the company's operations have been eminently successful, and have quite equalled the most sanguine expectations of your directors; and they hope that with increased exertions on their part, assisted by the cordial co-operation of both the proprietors and policyholders, they will be enabled to lay before you at the next annual meeting a still more gratifying report.

Your directors advert with pleasure to the increasing attention which is daily bestowed on the subject of life assurance by all classes of the community. The Government has shown its estimate of its value as a social question, by the reduction of the duty formerly imposed upon policies to an amount so low that your directors have for some time past issued their policies free of duty stamp. Besides the reduction in the stamp duty, the Government has further shown its appreciation of the value of life assurance, by allowing an abatement of duty on incomes in respect of annual premiums paid for insurances. See the clause in 17 and 18 Vic., cap. 34, intituled, "An Act for Granting to Her Majesty Duties on Profits arising from Property, Professions, Trades, and Offices."

The Government has also further decided, in proof of its anxiety to support the principals of life assurance, to appropriate the unclaimed money accumulated in the Post Office, amounting to £15,000, to the effecting policies of insurance on the lives of the officers of that national establishment.

This company may now be considered fully established, and its expenses in future will bear a much smaller ratio to the amount of business transacted.

A dividend, at the rate of 5 per cent., has been paid upon the capital stock of the company for the past year, in conformity with the Deed of Settlement, and under the authority of Mr. Nelson, the consulting actuary of the company.

Pursuant to the terms of the Deed of Settlement, the following directors retire by rotation, viz.:—Messrs. Barnes, Prinsep, Knox, and Riddell, who are eligible for re-election, and offer themselves accordingly.

Two of the auditors, Messrs. Jones and Sheridan, also retire from office, by the provision of the company's deed.

Your directors, in conclusion, desire to remind the shareholders that the success of the company may be greatly increased, and its operations extended, by the personal exertions of the shareholders themselves; and they would, therefore, urge upon them to endeavour to make the company, and the advantages it affords, known among their friends and connections; and to show their own confidence in it, by themselves assuring, if not already assured.

Lord Drumlanrig then said, that the report which the meeting had just heard read by Mr. Bevan set forth the position of the company so clearly, that it must be very satisfactory, and a subject of congratulation to those who had taken shares, and to all who were interested in the success of the company. He did not think there was an instance of any young office that had met with more complete success. They would see by the report that they had in the course of a year increased their annual income to the immense amount of 10,542*l.* It was also shown that three deaths only had taken place during the year, involving an insurance of about 621*l.* This was a subject of congratulation to the directors, as well as to the shareholders, as it showed that their medical officers had done their duty with care and diligence. Next to their medical officers, he would refer to their agents, and he might say that in that respect they had been blessed and cursed. They had in the outset been at some disadvantage, owing to their being at the mercy of their agents, but this difficulty had been surmounted, and those who had been since and were now employed had been found most efficient in every way, and had now become very effective. In Oldham, during the last four months, 150 policies had been issued, bringing in upwards of 200*l.* In Bristol, they had just opened an office, and had done business to the extent of 800*l.* In Birmingham, to 1000*l.* income, and in Leeds, 1000*l.* He found that the agents they now had were of the greatest service to the company, and by the energy and activity of Mr. Egleston their business at Leeds had very materially increased. Agencies had also been established in Northampton and Manchester, which had met with the greatest success. The last subject to which he would refer was that of the loan department, and which it was proposed to extend by the raising of additional capital. For this purpose it was proposed to issue 20,000 more shares. The loan department had been found to work very successfully. Parties who borrowed money in this way generally insured for twice or three times the amount, and the nature of the business brought a great number of insurers. He was happy to say that the whole of their shares had been paid upon; he held 500 himself, and if the proposition now submitted be carried into effect, he should be prepared and most happy to take double the number of shares which he now held. His lordship concluded by moving that the report be adopted.

Mr. Prinsep seconded the motion, observing that the report spoke for itself, and that every shareholder who read it would, he thought, see the importance of increasing the capital, for by increasing their capital they would also increase their business and their profits.

Mr. Knox, a director, observed in reference to the prospects the company had of increasing its business, that nearly half their present policies had come from four places—viz., Bristol, Oldham, Birmingham, and Leeds; and that when their agencies were fully established in other large towns, they would, no doubt, go on increasing in the same ratio. In looking over the accounts of other offices, he found that there was only one office that had made so large a return in its second year as the amount stated in the report. But, in fact, they could hardly call it the second year; it was scarcely more than 15 months which had produced the income of 10,000*l.*, the business during the first three months being merely nominal, and he believed that in the course of the next year their business would considerably increase. The premiums were promptly paid, and he considered that the company was now fairly established. Their expenditure, which had hitherto been large, would now be reduced in proportion to their business, and he considered their success beyond a doubt. Their expenditure would go on decreasing from year to year. In conclusion, he would observe that, as he saw their actuary, Mr. Nelson, present, he should be happy to hear his opinion on the position and prospects of the company.

Mr. Nelson observed, that the statement of the directors, which had been laid before the meeting, spoke for itself, and sufficiently evinced that a large business had been done. There were few instances of a new office making such rapid progress; and as to the future it was very encouraging. Without a due amount of intelligence and activity on the part of an infant society, it was not competent to keep up a ramified system, so as to bring it to the brilliant position which this company had attained; while, from what he knew of the exertions made by their secretary, and the success that had attended the organization of their agents, he believed that they might confidently look forward to more extensive benefits. Mr. Knox had alluded to their large expenditure, but he (Mr. Nelson) could not see the means of launching a public company without considerable outlay. He would repeat what he had before said elsewhere, that it was better to spend 10,000*l.* at once to obtain a large business, than drag it over four or five years to obtain an equal amount of business—all experience proving that the "slow and sure offices," as they were called, could not obtain a business under that amount. Of course, when he spoke of a large expenditure, he meant that it should be also judicious, and that it was so in this case was shown by the large fruits it had borne, and which it was pleasant to contemplate. He could easily prove that the same amount of expenditure will not be necessary, for as their profits increased their expenditure would be reduced. If the shareholders had confidence in those entrusted with their affairs, their money, they might be assured, would not be spent in a foolish or unprofitable manner. With respect to the loan business, he believed that it would have a most beneficial effect on the community generally, it being a source from which the society would derive both large and profitable returns.

Mr. Swire (holder of 2700 shares) moved a proposition, which was unanimously carried, that the remuneration of the directors be continued for the current year.

It was then proposed and carried, that a sum of 15 guineas each should be paid to the auditors.

Mr. Prinsep moved a vote of thanks to the medical officers for the care taken by them in the selection of lives for their policies. The small number of casualities which had occurred, and the amount of applications made to the company, fully proved that they exercised the greatest care in their selection of parties to effect insurances.—Mr. Riddell seconded the vote of thanks to the medical officers.

Dr. Scanlan returned thanks for the honour done to the medical officers.

On a vote of thanks to the chairman and directors,

Lord Drumlanrig observed, that for himself he had endeavoured to do his duty to the shareholders, as had the other directors. He himself was an assurer for 4000*l.*, and he believed that the other directors were also assurers. It behoved them all to assure; and it was right that a vote of thanks should be passed to the agents.

Mr. Cracknell seconded the proposition of a vote of thanks to the agents, to whom they were much indebted.

Mr. Davis, of Manchester, Mr. Perks, of Birmingham, and others from Oldham, Derby, and Bristol, handed in proposals for policies to the amount of 16,372*l.*

Mr. Knox then rose, and said that it had been his pleasurable duty last year to propose a vote of thanks to Mr. Bevan, the secretary. During the past 12 months he had had many opportunities of observing Mr. Bevan's energy and spirit in forwarding the views of the society; all his time and energy were devoted to the success of the company, and much of their successful appearance that day was owing to his exertions. He must also commend Mr. Bevan for the judicious choice he had made of the various agents they then had in their service.

Mr. Poole seconded the proposition, and observed that Mr. Bevan's exertions were quite astonishing—his activity, both of body and mind, surprised him; without his energy their agents would never have been so successful on the part of the company.

Mr. Prinsep begged that it might go forth that this vote of thanks was seconded by every member of the board.

Mr. Cody, of Bath, moved that 150*l.* should be presented to Mr. Bevan.

Mr. Bevan returned thanks, at the same time remarking that he was unaware of the fact that Mr. Cody was in town, or that he was about to make such a proposition as he had, or he should have requested him to have abstained from doing so.

Mr. Knox observed, that Mr. Cody's suggestion had better be left to the Board; they had it in contemplation to increase Mr. Bevan's salary.

Lord Drumlanrig then left the chair, as his presence was required at Buckingham Palace.—Mr. Prinsep was moved into the chair, and an extraordinary meeting was held, at which the following resolution were unanimously carried:—

That this meeting, thinking it advisable to raise more money for the purpose of the company, with the view particularly of developing the loan operations thereof, hereby resolve that the temporary capital of the company shall be increased to an amount (inclusive of the present temporary capital thereof of 20,000*l.*), by the creation and sale of new shares of 5*l.* each. That the number of new shares to be created shall be 20,000, and that the present proprietors, policy-holders, agents, and medical officers of the company shall have an option, to be declared not later than the 10th day of June, 1854, of subscribers for taking such new shares, without payment of any premium thereon respectively, or at par, under and subject to such restrictions upon, and such rules and regulations with reference to, the exercise of the option as the directors shall from time to time impose, or make and declare. That such of the new shares as shall not be disposed of at par, pursuant to the last resolution, shall be issued and sold by the board of directors to any person or persons who shall be willing to purchase the same at a premium of 2s. 6d. per share, or on such other terms as the directors might from time to time determine.

That as regards the payment of deposit instalments, the new shares to be created shall, as far as circumstances will permit, be placed on the same footing as shares on the present or existing temporary capital fund, and accordingly the sum of 10s. shall be paid as the first deposit upon each of the same shares disposed of, pursuant to the second and third resolution.

That to give effect to these resolutions, the above be inserted in the various morning and other papers.

Certain Paradoxes of Rotatory Motion.—At the last meeting of the Royal Institution an interesting lecture was delivered by Professor Powell, who explained in a popular manner the abstruse subject of "Certain Paradoxes of Rotatory Motion," which have much occupied the attention of scientific men on the Continent. He commenced by observing that the present age might be termed the age of rotation; two years ago we were all watching the rotation of the earth by means of Foucault's pendulum experiment; last year our heads were turned with turning the tables; and now the special advantages of rotatory bullets are undergoing investigation; and, accordingly, our soldiers have gone out to shoot the Russians, armed with the Minie rifle. It was on this account, he said, that he had chosen for his subject some curious and interesting circumstances connected with rotatory motion, which might be justly termed paradoxes, and which, although they have been known and investigated on the Continent, are very little known in England. Prof. Powell said he had been often asked whether his subject was connected with table-turning, and he begged to say he did not pretend to deny or to affirm that some of the facts he should mention might or might not be supposed to have reference to the rotation of tables, though they were certainly not directly applicable. A German philosopher, Ferrell, had tried many interesting experiments on the influence of rotation on bodies, which led to the conclusion that the effect of communicating rapid rotatory motion is to diminish weight. He constructed an instrument consisting of a horizontally suspended bar, having a wheel at one end to which rotatory motion could be given. When the point of suspension was shifted so as to make the wheel end the heavier, the horizontality of the bar was restored by communicating motion to the wheel, and so remained as long as the wheel was kept turning, but as the speed of rotation diminished, the wheel end gradually dropped down. Instead of descending perpendicularly, however, it leaned on one side. This experiment was shown by a wooden model, large enough to be seen by the whole audience, also a beautiful apparatus of Prof. Wheatstone's, which exhibited the phenomenon more satisfactorily. It appeared from this experiment that a body rotating is lighter than a body at rest; and thus, as Prof. Powell remarked, a leg of mutton when roasting weighs less than when brought to table. Another apparatus contrived by Prof. Wheatstone, for illustrating the same phenomenon was exhibited with similar results. Adverting then to another branch of the subject, Prof. Powell noticed some experiments recently made in the Prussian army with missiles of a cylindrical shape with conical apices, the directions of which were found to vary with the amount of propelling charge. When the charge was low, those missiles deviated to one side. This fact was illustrated experimentally by means of paper shuttlecocks. Prof. Powell also exhibited some card-board bomerangs, the return of which to the point from which they were propelled he instanced as one of the paradoxes of rotatory motion. He said he thought these various paradoxes might be explained by a body when acted on by two forces in different directions, the resulting motion being a compound of the two. He stated, however, that many scientific men differed from him as to the cause. He believed that the precession of the equinoxes might be accounted for by these paradoxes of rotatory motion. The star Alpha Draconis was to the ancients the Pole star, and was inclined to the earth at an angle of 26°, exactly as the inclinations of the pyramids at the time they were built, and those stupendous relics of past ages might thus be regarded as gigantic observatories, by which Pharaoh's astronomer royal regulated his chronometers.

Magnetic Meridian.—The term magnetic meridian has been applied to the line or direction indicated by a magnetic needle freely and delicately suspended on a centre. These lines seldom correspond to the true meridian from pole to pole, and are perpetually varying in their direction, not only from general causes, but also from local effects. They frequently differ in the angle of variation, even in the same meridian, being often easterly in one place and westerly in another. One of the lines of no variation is considered to cross the centre of Australia to the Indian Archipelago; but this cannot be depended upon, and I would strongly recommend all those requiring the use of the compass for their researches or guidance, on the ocean, in the interior of continents, or in ascertaining the true bearing of the primary rocks, to observe constantly the actual local variation. However delicately needles may be balanced in England, or any other places in the nothern hemisphere, they become sluggish in their vibrations when brought to the southern hemisphere, in consequence of the tendency of the south end to drop, owing to its proximity to the south pole, and its consequent increased influence; therefore all needles require re-balancing; the north end must be made heavier by means of a little wax or any other adhesive substance. The direction or bearing of the structure of the primary rocks needs not such exactitude as is required in the delineation of a coast; still it ought to approximate to the truth. Should the magnetic variation at the place of observation happen to be on the contrary side to that supposed by the observer, and laid down accordingly on a map, it would lead to a very inconvenient error and to erroneous conclusions. Surveys made solely by compasses, and without the usual checks for correcting the magnetic variations, cannot fail to produce great confusion in the boundary lines between different properties. All territorial surveys and maps should be strictly made and laid down according to the direction of the true meridian. I remember an instance in South America, where the magnetic variation had varied from 6° 30′ to 8° 30′ east in the course of a few years, and where certain new communications had to be made underground in long-established mines, which, had they been made according to the old maps and plans, would have led to a very expensive error. This, however, was prevented by my taking new observations. Numerous properties, as well as mines, would be brought into endless litigation by the continual variation in the direction of the magnetic needle, if places were constantly laid down and measured from the local direction of the needle instead of the true. The direction of the magnetic needle in England, about 250 years ago, was 11° east of north; it is now about 24° west of north, and is constantly undergoing a slow oscillation. Besides progressive changes, there are annual or periodical movements and daily oscillations constantly taking place in all parts of the world where magnetic observations have been made. This subject is very important, and should be well considered in a new country like this, requiring a general survey, and the marking of the divisions of properties. The surveys should be made on base lines and triangulations, and the direction of the magnetic needle indicated at the period taken, and that specified, and not taken for granted, and marked according to old observations. [In making astronomical observations to ascertain the geographical position of any given point in this zone, it is necessary to beware of an error which has crept into and is still retained in our nautical almanacks—viz., the variable diameter of the sun. It is known that when we measure the sun's diameter in its meridian altitude in the nothern hemisphere, it appears 31 min. 30 sec. in June, and 32 min. 36 sec. in December. It is said that this is owing to the eccentricity of the orbit. Those who have taken the trouble to make such measurements with delicate instruments find that the sun is always the same diameter throughout the year, if measured in the zenith—that is, 30 min. 36 sec.; and on descending towards the horizon there is an apparent increase in the diameter, owing to refraction, until it amounts to 33 min. Hence the apparent diameter depends on the angular position. This variation is of little consequence in taking the latitude, but it is a serious affair in the longitude, and often amounts to about seven miles. In latitude 40° south, on the 2d of June, 1852, I drew the attention of Capt. Smith, of the *Futtel Oheb*, to this subject, and requested him to make direct observation to prove it. The Nautical Almanack indicated a diameter of 31 min. 34 sec. The meridian altitude of the sun was 22°, and its actual apparent diameter was found to be 32 min. 22 sec., being a difference of 48 sec., causing an error in calculating the longitude equal to six miles. The captain became so convinced on this subject, that he determined in future to be guided by the variable diameter of the sun according to its angular position; and I would recommend all others to do the same in taking observations in southern zones. This question is fully explained in page 130, of *Geology and Magnetism.*]—*Hopkins's Geology of the Gold-bearing Rocks of the World.*

Gold.—This is the most common metal found in nature—it is more or less diffused in the primary rocks in all parts of the world. The question has not been where gold is to be found, but where it can be obtained in sufficient quantities to pay for the labour of extracting it. Gold is found in the tin streams of Cornwall, and is frequently associated with the oxides of this metal, in the schoriaceous slates, and granites, and very common in the gossans of iron and copper; it is detected also in the ferto-felspathic and slaty rocks of Scotland and Wales, and their intersecting ravines. The revival of the gold discovery in the streams of the Ballin Valley, in the county of Wicklow, in Ireland, caused almost the whole population of the neighbourhood to neglect for the time the produce of their fields; all flocked to the golden harvest; stream works were established, and continued for a few years, and many large lumps were found, but the superficial product was soon sunk in the quartz mining; and such has been the case in many other parts of the world, where such works have been carried on by mining companies.—*Hopkins's Geology and Magnetism*, 2d Edit.

DIVIDENDS OF PROFITS DECLARED

By Seventy-eight Cornish and Six Devonshire Copper, Lead, and Tin Mines, during the last Eight Years, ending December, 1853.

MINES.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	Total Amount for eight years.	Amount paid in Dividends prior to end of 1845.	Present Market Value. 3rd April.	Total Amount of present value together with Dividends paid to end of 1853.	Original Outlay.
	£	£	£	£	£	£	£	£	£	£	£	£	£
Basset...	1,280	...	1,280	6,400	14,080	15,360	21,760	30,720	90,880	35,840	179,200	305,920	2,624
Balleswidden...	2,040	933	...	2,922	3,451	3,247	1,948	2,307	16,848	8,894	11,000	36,742	18,270
Boscaswell Downs	...	...	...	800	...	...	...	...	800	47,200	nil.	48,000	nil.
Botallack	1,500	...	...	...	1,000	1,500	2,550	6,500	13,050	44,000	72,000	129,050	18,250
Brewer	600	...	...	...	...	...	...	...	600		3,840	4,440	1,024
Callington	3,000	3,000	...	...	...	...	...	...	6,000	1,000	10,000	17,000	39,250
Carn Brea	12,000	20,000	14,000	15,000	13,000	9,000	6,000	12,000	101,000	124,500	85,000	310,500	15,000
Chyprase	1,239	...	...	...	...	...	...	...	1,239		nil.	1,239	2,360
Devon Great Consols...	37,888	15,360	30,720	34,304	40,960	40,960	46,080	65,024	311,296	64,512	440,320	816,128	1,024
Dolcoath	...	...	...	...	...	...	...	2,595	2,595	153,707	16,110	172,412	46,137
East Crofty	3,995	1,880	...	470	...	...	...	...	6,345	72,615	9,400	88,360	11,750
East Rose	30,720	34,560	25,500	17,920	16,000	9,280	2,240	...	136,220	171,140	16,000	323,360	6,400
Fowey Consols	...	...	...	...	1,976	...	...	...	1,976	202,644	9,880	214,500	20,480
Friendship	5,220	2,560	2,240	3,840	2,880	1,536	1,024	3,584	22,884	280,156	12,800	315,840	nil.
Great Consols	...	3,500	...	960	960	...	...	...	5,420	28,508	nil.	33,928	96,000
Great Work	...	...	...	2,677	4,165	2,975	3,451	2,082	15,350	4,404	17,850	37,604	11,900
Levant	...	1,280	...	6,720	4,000	3,040	320	320	15,680	150,400	16,000	182,080	400
Margaret	2,016	6,720	3,136	4,368	3,136	1,568	392	952	22,288	1,792	15,680	39,760	8,848
North Roskear	4,550	2,450	1,820	1,120	2,800	4,270	910	2,380	20,300	14,700	21,000	56,000	1,400
Owles...	...	...	...	...	...	...	996	4,040	5,036	5,816	40,000	50,852	5,600
Par Consols	...	3,072	12,800	19,200	12,800	5,120	15,360	4,800	73,152	75,968	51,200	200,320	7,200
Providence Mines	...	...	...	3,640	2,576	1,680	...	840	8,736	2,870	9,800	21,406	11,550
Seaton	8,910	11,880	8,415	1,584	5,940	4,752	4,752	3,366	49,599		54,450	104,049	21,186
South Caradon	6,400	7,680	3,840	640	384	3,840	1,280	6,400	30,464	46,846	76,800	154,110	640
South Frances	744	9,796	5,704	7,192	10,478	10,416	6,696	6,076	57,102	992	62,000	120,094	9,393
St. Ives Consols	4,700	...	...	470	282	1,222	1,974	1,410	10,058	73,414	11,750	95,222	7,520
Stray Park	3,000	4,000	500	1,000	3,000	...	...	...	11,500	1,000	10,000	22,500	10,375
Tamar Consols	...	...	...	5,760	...	...	...	...	5,760	37,920	14,400	58,080	43,200
Tincroft	3,000	...	...	2,100	3,150	...	3,150	3,150	14,550	27,000	21,000	62,550	42,000
Trelawney	3,120	...	...	3,640	5,720	2,340	...	5,200	20,020	1,560	18,720	40,300	4,615
Trenow Consols	1,280	...	...	...	...	...	...	...	1,280		nil.	1,280	5,120
Treavean	1,728	1,968	...	...	...	...	...	...	3,696	449,094	28,800	481,590	3,120
Trethellan	2,400	1,200	1,200	...	600	300	...	...	5,700	42,741	1,440	49,881	900
Treviskey and Barrier	1,920	5,910	2,180	3,120	8,760	6,780	4,770	540	33,980	3,020	4,800	41,800	15,600
United Mines...	7,500	2,500	1,000	2,000	1,000	500	5,000	11,600	31,100	438,900	64,000	534,000	16,000
West Caradon	8,320	4,864	2,460	3,840	1,920	4,224	7,424	10,496	43,548	18,212	64,000	125,760	5,120
West Providence	768	704	409	2,048	1.024	2,560	10,752	6,656	24,921		32,768	57,689	5,120
Ball	...	120	..	...	...	...	...	...	120		4,320	4,440	1,560
Franco	...	388	...	388	...	...	...	..	776		nil.	776	10,476
North Pool	...	1,000	7,750	11,750	14,250	9,000	5,500	7,000	56,250		35,000	91,250	4,500
Sisters	...	1,024	...	...	...	...	...	...	1,024		nil.	1,024	7,616
Spearne Consols	...	700	256	880	1,376	1,920	2,048	896	8,076		6,144	14,220	1,280
Trehane	...	1,280	1,472	2,688	896	1,024	128	2,048	9,536		9,000	18,536	1,536
Treleigh Consols	...	4,500	1,000	...	...	...	...	...	5,500		5,000	10,500	30,000
Vyvyan	...	552	...	...	...	...	...	...	552		nil.	552	nil.
Bedford United	...	...	2,000	3,000	4,000	4,600	4,000	4,700	22,300		35,000	57,300	9,500
Buller	...	...	...	2,560	13,120	17,920	24,960	45,440	104,000		256,000	360,000	1,280
Comfort	...	...	...	1,654	768	...	...	...	2,422		3,840	6,262	19,200
Condurrow	...	...	...	1,536	1,280	512	2,304	4,608	10,240		35,840	46,080	5,120
Great Polgooth	...	...	...	5,504	...	1,100	4,950	...	11,554		15,000	26,554	48,125
Mary Ann	...	...	...	640	5,632	4,608	1,024	1,792	13,696		16,000	29,696	2,680
Tremayne	...	...	...	512	3,328	3,584	3,072	512	11,008		7,168	18,176	9,856
Wellington	...	...	..	896	1,024	768	...	...	2,688		2,560	5,248	8,488
Alfred Consols	...	...	...	...	2,048	9,472	16,128	20,736	48,384		122,880	171,264	14,336
Friendly	...	...	...	...	500	...	...	...	500		2,000	2,500	7,000
Lewis...	...	...	...	...	500	1,500	...	...	2,000		10,000	12,000	17,000
Lovell ...	...	...	..	...	860	3,440	4,300	1,720	10,320		21,500	31,820	14,190
North Basset...	...	...	...	...	3,000	1,500	1,500	6,000	12,000		42,000	54,000	nil.
Penzance Consols	...	...	...	...	128	...	...	...	128		2,000	2,128	3,656
Reeth...	...	...	...	...	3,900	3,000	2,500	...	8,500		5,760	14,260	4,920
South Tolgus...	...	...	...	...	3,712	4,224	7,168	2,304	17,408		32,000	49,408	4,096
Calstock United	...	...	...	...	...	1,000	...	...	1,000		10,000	11,000	13,500
Golden	...	...	...	...	...	3,250	1,250	...	4,500		8,750	13,250	20,000
Herodsfoot	...	...	...	...	...	384	...	1,920	2,304		7,680	9,984	8,704
Perran St. George	...	...	...	...	...	2,030	...	...	2,030		5,000	7,030	3,440
Phœnix	...	...	...	...	...	3,000	10,000	...	13,000		100,000	113,000	6,000
Polberrow	...	...	...	...	...	2,680	...	3,283	5,963		14,000	19,963	15,000
Trumpet Consols	...	...	...	...	...	500	2,000	2,000	4,500		15,000	19,500	9,500
Clifford	...	...	...	...	..	..	...	568	928		25,000	25,928	nil.
Drake Walls	...	...	...	...	...	...	640	960	1,600		3,500	5,100	4,060
Exmouth and Adams	...	...	...	...	...	...	1,070	1,605	2,675		42,800	45,475	20,972
Gonamena	...	...	...	...	...	...	256	...	256		14,336	14,592	12,544
Great Onslow...	...	...	...	...	...	...	5,000	...	5,000		25,000	30,000	37,500
Jane	...	...	...	...	...	...	256	1,792	2,048		10,240	12,288	nil.
Rix Hill	...	...	...	...	...	...	389	779	1,168		3,896	5,064	6,818
South Tamar...	...	...	...	...	..	...	4,500	6,750	11,250		60,000	71,250	11,925
St. Aubyn and Grylls	...	...	...	...	...	...	896	...	896		3,072	3,968	3,072
Arthur	...	...	...	...	...	...	...	614	614		36,840	37,454	11,052
Mark Valley...	...	...	...	...	...	...	...	750	750		30,000	30,750	27,150
Mendip Hills...	...	...	...	...	...	...	...	2,500	2,500		12,500	15,000	18,750
Trelyon	...	...	...	...	...	...	...	429	429		1,716	2,145	6,578
Treweatha	...	...	...	...	...	...	...	1,024	1,024		20,480	21,504	11,264
West Darlington	...	...	...	...	...	...	...	256	256		2,560	2,816	13,952
West Treasury	...	...	...	...	...	...	...	1,024	1,024		5,120	6,144	10,487
	159,838	155,381	129,682	185,743	225,464	217,486	255,028	317,048	1,645,670	2,631,365	2,628,510	6,905,545	1,014,059

42, *Lombard-street, City, April 6.*

RICHARD TREDINNICK, Mining Broker.

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